

general health and physical condition, with alleviation of the distressing symptoms.

1. In the case of those patients where the symptoms or growth is external: there is of course, the opportunity of observing the changes that take place, from time to time, in the abnormal tissue. The degeneration of the hard nodular mass with a serous to a sero-sanguineous fluid discharge, probably from the necrosed abnormal tissue, may in those cases be readily observed.

2. In the case of those patients suffering from the disease internally I have observed that they periodically develop symptoms resembling those of a toxic nature, which symptoms and attacks lessen as their general health improves.

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#### RÉSUMÉ

Un régime alimentaire simple, approprié, naturel, bien équilibré et riche en vitamines semble avoir les meilleurs effets sur le cancer humain, comme le fait fut observé chez les souris atteintes de carcinôme dû au goudron. Neuf cas sont rapportés qui paraissent prouver objectivement et subjectivement l'efficacité de la cure. Chez les malades à ascendance cancéreuse et chez ceux qui sont porteurs de lésions d'allure très maligne on ajoute au régime spécial l'apport de vitamines additionnelles du commerce. La question de la durée du traitement est encore à l'étude. Les cas désespérés ont bénéficié jusqu'à un certain point de ce mode de traitement.

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## A RADIOLOGICAL STUDY OF MASTOIDS IN CHILDREN\*

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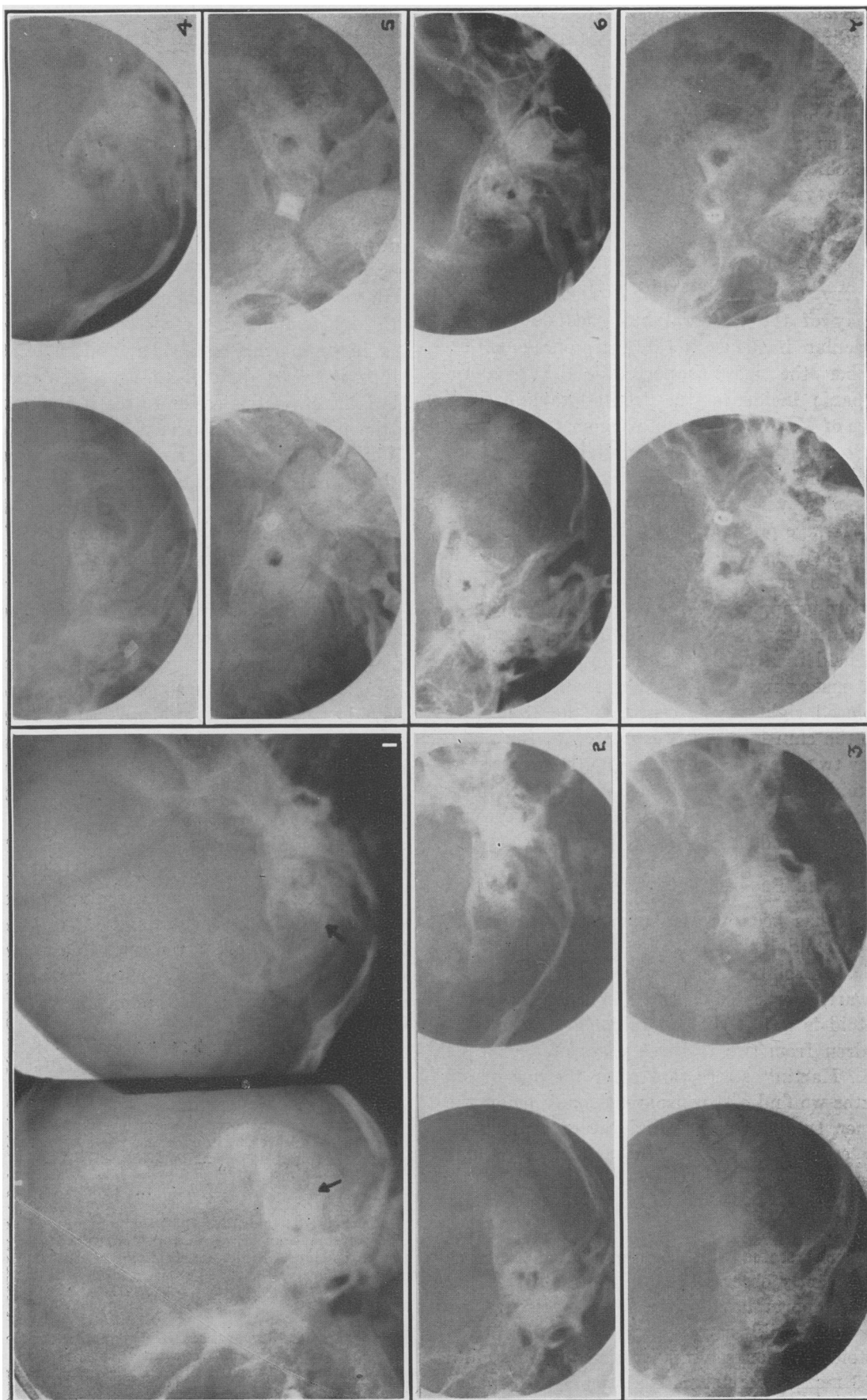
THE study of the development of the mastoid bone and of its aspects at the different stages of childhood has not been an object of research during the first years of the "radiological era". However, we find in the literature in 1913 a very interesting work written by Stewart, entitled "Radiographical indications showing the anatomic development of the mastoid". The author relates the story of well developed mastoids in children of two years of age. Gerber in 1919 corroborated Stewart's principles. Besides, Law,<sup>1, 14</sup> Lange and Goldstein have given us several indications in the course of general reviews. Towards 1922 Ferreri published "A study about the radiological examination of the ear development in fetal life". In 1923 Evans<sup>12</sup> showed us "the value of a radiological examination in affections of the mastoid in children under five years of age". Amédée Granger,<sup>6</sup> gave us something new in the radiological study of mastoidal suppuration in children. In France those who were specially interested in the question were Lemée and Bernard, Gunsett, Bétouillères<sup>7</sup> and Bouton; in Austria, Mayer and Fisinger; in America, Martin,<sup>10</sup> Crain<sup>9</sup> and Schillinger,<sup>8, 13</sup> Finally, the most important references may be found in the theses of Gaillard

and Bouton and also in the magnificent thesis of Balmès,<sup>4</sup> of Montpellier.

#### ANATOMY

According to Balmès the following are the types of pneumatic cavities which we find in children. (1) An antrum with diploic mastoid, which is generally seen in the course of the first year. It is constituted by a mass of spongy tissue surrounded by a layer of compact tissue called cortical. (2) An antrum with pneumatic mastoid. This is all the more frequent as the child is older. It is entirely penetrated with ventilated cavities separated from each other by thin walls of compact tissue. Such cases permit an early radiological diagnosis. (3) A compact mastoid, represented by an eburnated bone with a very small antrum and appearing as if deprived of all other pneumatic cavity. This type is seldom seen in children. (4) A mixed type, comprising at the same time compact and pneumatic parts. The mastoid antrum is the only pneumatic space present in the new-born. It is a large space situated in the upper and anterior part of the mastoid process immediately behind the tympanic cavity; its roof, the mastoid tegmen, is directly continuous with that of the tympanic cavity, the tegmen tympani. It is a long cavity, larger than in the adult, communicating with the middle ear through the

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Figures 1 to 7

aditus ad antrum. There lies the road to the spreading of infection, the mucous membranes of the middle ear and of the mastoid being in direct connection.

The younger infant's roentgenogram will reveal as landmarks (1) the auditory canal; (2) the cochlea; (3) the semicircular canals; (4) the tegmen tympani; (5) the mastoid antrum, and (6) the pre-mastoid.

#### GENERAL TECHNIQUE

Every author who has studied the radiography of the temporal bone has described a particular incidence. However, one must remember the most important—the temporo-tympanic incidence, the fronto-tympanic incidence of Mayer, the occipito-zygomatic incidence of Stenvers, the fronto-occipital incidence of Worms and Breton. The difficulty in obtaining immobility with children and the fact that at a young age pneumatization is always markedly diminished, have induced us to use in Doctor Comtois's service, in most cases, the lateral temporo-tympanic incidence.

Infants less than two years of age are placed and held in a prone position by a nurse. We must make sure that the external auditory canal is placed right in the centre of the circle and that the chin is in good contact with the plate. After two years of age we use a 10° angle reflex mastoid unit. An exposure of one-tenth of a second is made with high milliamperage exposure (rotating anode tube).

#### THE PROCESS OF PNEUMATIZATION

This has been particularly well studied for the mastoidal apophysis by Witmark, but the typical evolution has numerous exceptions. Stewart, Gerber and Law<sup>14</sup> consider that the mastoid is well developed radiologically only in children from two to three years of age, while C. L. Martin<sup>10</sup> states that after the age of six months we find a "transparent zone" below the tegmen tympani and behind the external auditory canal. That zone may assume a cellular appearance about the age of nine months, although the early development does not usually take place.

Evans<sup>12</sup> states that the pneumatic structure is frequently observed before the first year, and Law<sup>14</sup> reports having found in a twenty-two days old child a radiologically pneumatized mastoid. We ourselves have observed in a child of 13 months a pneumatized mastoid. Finally,

all the authors underline the fact of the extreme variability of the mastoid complex.

#### PLATE INTERPRETATION IN PATHOLOGICAL CASES

In the presence of a manifest otitis what is the extent of the lesions? simple otitis? antritis? mastoiditis?

At the sight of a general infection we ask is there anything related to the ear? With the nursling, often enough, an extensive injury may only be shown by meningeal troubles as well as by digestive troubles such as vomiting, diarrhoea with high temperature, etc. The diagnosis consists in comparing both sides, and in bilateral injury it seems difficult to make. When one side is healthy it is easier to see if the antrum or the periantral region is veiled.

When the pneumatization is advanced enough, and when the cells contain pus, an important increase of the opacity as well as loss of clearness of the cellular contours are noted. If the bony destruction is far advanced, instead of having an increase of the opacity, we may observe the presence of a marked transparency (abscess). The interpretation is so much the easier as the pneumatization is more developed.

An indirect sign of mastoidal osteitis and of mastoidal abscess has been described by Amédée Granger.<sup>6</sup> In the young child the lateral sinus groove is not visible. When the sinus groove is seen in a patient aged less than two years there is presence of destructive osteitis.

Another indirect sign of mastoidal osteitis has been described by Bernard and Lemée. In children below one year semicircular canals are seen, but they disappear normally after the first year. The visibility of the semicircular canals after the age of two would mean the bony destruction of the mastoidal apophysis.

#### CASE REPORTS

##### CASE 1 (Fig. 1)

Infant aged 8 months. Right discharge with 100° temperature, no trabeculations are visualized. Haze of antrum, semicircular canals and pre-mastoid. Right mastoiditis found at operation.

##### CASE 2 (Fig. 2)

Infant aged 9 months; 103° temperature. Haze on right antrum and "pre-mastoid" area. No sign of pneumatization. Right mastoiditis, treated by short wave diathermy.

##### CASE 3 (Fig. 3)

Infant aged 13 months. Early pneumatization on left side. No trabeculations are visualized on right side. Lemée and Bernard sign. Right mastoiditis with destruction proved at operation.

## CASE 4 (Fig. 4)

Infant aged 7 months. Right discharge since one week after one paracentesis; 99° temperature. No sign of pneumatization. Sinus grooves are not visible. Transparent zone below the tegmen tympani and behind the external auditory canal. No radiological sign of bony lesion.

## CASE 5 (Fig. 5)

A child of 5 years of age. Diploic mastoid type. Haze on left side, but trabeculations are traceable. Simple acute left mastoiditis. Infection resolved after roentgen therapy.

## CASE 6 (Fig. 6)

A child of 2 years of age. Early pneumatization. No sign of mastoiditis.

## CASE 7 (Fig. 7)

A child 8 years old. Large pneumatic mastoids extend well into the zygoma.

## CONCLUSIONS

The radiological study of the child's mastoid comprises two periods: the first, which extends from birth until the age of five and presents a certain difficulty in interpretation, is specially limited to the antral and periantral region; the other, from the age of five, in which the radiological methods of investigation are in no way different from those of the adult patient. Under the age of five, the difficulty of interpretation is as much greater as the pneumatization is less advanced. There are more possibilities of finding a pneumatized mastoid if the child is older, but we must remind ourselves, according to some

authors, for instance, Evans, Martin, Stewart and Law, that pneumatization is more precocious than we usually think. The signs demonstrated by Granger, Lemée and Bernard seem to be unfrequent and of difficult interpretation.

As we may see, the radiological examination of a child's mastoid, even below the age of five, is very important. We are then in a position to make, very often, early diagnosis of that dreadful mastoiditis of early childhood otherwise than on operative or necroscopic grounds.

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## GRANULOMATOUS LYMPHADENITIS CAUSED BY FILARIAE\*

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**H**UMAN infestation with the nematode worm filaria, although widely distributed in tropical and subtropical parts of the world, is uncommon in the temperate zone and extremely rare in Canada. The occasional case encountered in Canada is invariably the result of the individual having been infected while living in some other part of the world.

There are several different types of filaria and related nematodes which may infect man. Of these *Filaria bancrofti* or *Wucheria bancrofti* is the most common. On this continent the disease is indigenous in the West Indies and in the south eastern portion of the United States.

It occurs as far north as Charleston, South Carolina. The parasite is found in the human host in two forms, the adult filaria or parent form and the microfilaria or embryonic form. The adult is a long, transparent, hair-like nematode 5 to 8 cm. in length. Male and female worms live together, often inextricably coiled about each other and tightly packed together in cyst-like dilatations of the lymphatics. The female worm is about twice the size of the male and somewhat broader. The fully mature and fecundated female filaria gives birth during her life to an unending stream of living embryos or microfilariae. These invade the lymphatics and eventually appear in large numbers in the blood stream. The microfilaria is less than 0.3 mm. in length

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